

AMENDMENT RESPONSIVE TO OFFICE ACTION

IN THE SPECIFICATION

Applicant amends the Specification as follows:

On page 6 line 6 change "integrated" to "integrator".

On page 6 line 8 change "quantifier" to "quantizer".

IN THE CLAIMS

Please cancel claims 9 and 10 without prejudice.

REMARKS

The specification was objected to for informalities. Applicant requests reconsideration. The specification has been accordingly amended. The claims 9 and 10 were rejected as indefinite. The claims 9 and 10 have been canceled without prejudice.

Claim 1 and 8 were rejected as unpatentable over Beauducel in view of Palmer. Claims 2-4 and 11 were rejected as unpatentable over Beauducel in view of Palmer in view of Potratz. Claim 5 was rejected as unpatentable over Beauducel in view of Palmer in view

1 of Scott. Claims 6-7 were rejected as unpatentable over Beauducel
2 in view of admitted prior art. Applicant requests reconsideration.
3

4 Regarding claims 1 and 11, Beauducel teaches an analog input,
5 a delta sigma modulator, a communication system having a
6 transmitter, a medium, a receiver, and a data detector for
7 providing a digital output. The invention includes an analog input,
8 a delta sigma modulator, a laser communication system having a
9 laser transmitter, a laser medium, and a laser receiver, as well as
10 a data detector for providing a digital output. A unique aspect of
11 the present invention, as correctly noted by the examination, is
12 the communication of an on and off "binary modulated laser signal"
13 through a laser communication system. The on and off laser
14 communication can be performed at very high switching speeds for
15 bandwidth efficiencies. What is obviously missing from the
16 examination analysis is the reason for the using the binary
17 modulated laser signal.

18
19 The examination concedes that Beauducel does not teach a
20 modulated binary laser signal. The examination's suggestion that
21 Beauducel teaches that different types of transmitters could be
22 used, as anything is possible, fails to recite the reasons for the
23 particular type of communications in Beauducel and the differing
24 particular type of communications in the present invention. The
25 examination incorrectly references Palmer as purportedly teaching

1 that a sigma-delta modulator can be used with a laser transmitter.
2 The use of a sigma-delta modulator in Palmer is not related to
3 sigma-delta modulation of an input analog signal, and Palmer is
4 irrelevant in all regards to the present invention, other than to
5 state that sigma-delta modulators are known devices. Palmer teaches
6 that "fractional frequency dividers using sigma delta modulation
7 may be used for the generation of subinterger multiples of the base
8 frequency" for RF communications which certainly does not relate to
9 binary laser communications. (Col 3 line 45, Col 4 line 22)

10

11 The sigma-delta modulator can generate high-speed pulse width
12 modulated signals. By using the high speed on and off laser
13 switching during laser transmitter and receiver communications, the
14 varying modulated pulse widths of the pulse width modulated sigma-
15 delta signal can be communicated and detected upon reception
16 through an on and off laser communication system. It is the
17 combination of sigma-delta pulse width modulated signaling and
18 binary modulated laser communications that enables precise
19 communications of the time varying pulse width modulated sigma-
20 delta signal.

21

22 Beauducel fails to teach using on and off binary modulated
23 laser signal for communicating a pulse width modulated sigma-delta
24 signal. Beauducel appears to be directed towards a slow two-line
25 synchronous multi-level communication system. Rather than

1 communicating a binary signal representing a sigma-delta pulse
2 width modulated signal, Beauducel first encodes the sigma-delta
3 signal into a multi-level coded signal that is time stamped, and
4 then accordingly apparently varies the amplitude of a light
5 emitting diode. Hence, Beauducel teaches a multi-level encoded
6 sigma-delta signal and multi-level modulated laser signal
7 communications. (Col 3 line 55-62) The intensity switching of a
8 laser diode between various levels is not simple on or off
9 toggling. The purpose of direct binary modulation of the on or off
10 toggling laser signal is to take advantage of the high speed at
11 which lasers can toggle for precisely replicating the varying pulse
12 widths of the pulse width modulated signal. Beauducel teaches just
13 the opposite, by teaching encoded sigma-delta signaling for M-ary
14 multi-level states, with time codes with the use of intensity level
15 modulation. That is, Beauducel encodes the sigma-delta signal with
16 timing clocking information so that the communicated signal is
17 self-clocking, and with reference to a clock, provides for
18 synchronous communications of an M-ary signal. The present
19 invention does not encode the sigma-delta signal with time
20 information, and as such, the communication is inherently and
21 preferably asynchronous in the present invention. Thus, Beauducel
22 uses encoded sigma-delta time-stamped multi-level signal with M-ary
23 intensity modulation for synchronous communications, whereas the
24 present invention uses pulse width modulated sigma-delta signaling
25 with on and off binary laser modulation for asynchronous

1 communications. The two signaling methods are directly contrary to
2 each other, and as such, Beauducel is strong evidence of
3 nonobviousness.

4

5 The examination concedes that Beauducel, Palmer, and Potratz
6 do not disclose a pulse width modulated signal detector, yet the
7 examination rejects the claims for obviousness based upon
8 conclusionary statements directed to their combined teachings. Yet,
9 none of these cited references teaches direct binary laser
10 modulation of a pulse width sigma-delta signal, as such, the cited
11 references in combination are strong evidence that the examination
12 is engaged in forbidden hindsight reconstruction as all references
13 fail to recognize that pulse width modulation of a sigma-delta
14 modulator, communicated by a high speed binary modulated signal,
15 would allow for high speed communications of an analog input
16 received as a digital signal. Also, Scott's use of a sigma-delta
17 modulator on the received side seems highly irrelevant as well. It
18 is not that isolated elements can be found in the cited references,
19 but rather whether the combined teachings as a whole would suggest
20 the claimed combination. None of the cited references teach the use
21 of a sigma-delta modulator for providing a pulse width modulated
22 signal for communicating an analog input signal as a binary
23 modulated laser signal. Allowance of the claims is requested.

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